

WHAT IS CLAIMED IS:

1 1. A distributed router comprising: ✓

2 a plurality of routing nodes each having a plurality of routing protocols; and

3 a switching module having a plurality of routing protocols corresponding to the routing
4 protocols of each of the routing nodes, disposed to share in real time routing information collected
5 by each of the routing nodes with others of the routing nodes.

1 2. A method of managing forwarding information, comprising the steps of: ✓

2 (1) when new routing information is inserted into a routing table in a distributed router in
3 which all routing nodes share a forwarding information made according to an aggregation tree
4 based on the routing table, detecting a position at which an insertion node corresponding to the
5 new routing information is to be inserted into the aggregation tree;

6 (2) determining presence and absence of an ancestor node of the insertion node at or below
7 a predetermined maximum aggregation level;

8 (3) leaving the forwarding table un-updated with information about the insertion node in
9 a presence of the ancestor node, when forwarding information is in the forwarding table and the
10 insertion node and the ancestor node have been generated from a common source area;

11 (4) in an absence of the ancestor node, resetting the aggregation level to a reset aggregation
12 level not greater than the maximum aggregation level, and inserting a delegation node
13 representative of the insertion node at the reset aggregation level; and

14 (5) making an insertion of forwarding information by determining the source area of the
15 inserted routing information, inserting forwarding information corresponding to the delegation
16 node in the forwarding table when the source area of the routing information is a virtual area, and
17 inserting forwarding information corresponding to the insertion node in the forwarding table when
18 the source area of the routing information is a local area.

1 3. The method of claim 2, comprised of, after making said insertion of forwarding
2 information when a delegation node is found to exist at the position of the insertion node while
3 detecting a position at which an insertion node corresponding to the new routing information is
4 to be inserted into the aggregation tree, deleting from the forwarding table forwarding information
5 corresponding to the delegation node.

1 4. The method of claim 2, comprised of:
2 after making said insertion of forwarding information when a delegation node is
3 found to exist at the position of the insertion node while detecting said position at which an
4 insertion node corresponding to the new routing information is to be inserted into the aggregation
5 tree, and when a left/right subtree of the delegation node exists,
6 reinserting nodes of the left/right subtree, and
7 deleting forwarding information corresponding to the delegation node from the
8 forwarding table.

1 5. The method of claim 2, wherein the step of comprises the steps of:
2 when the ancestor node of the insertion node is found to exist at or below the maximum
3 aggregation level while determining said presence and absence of the ancestor node, searching
4 for a descendant node of the insertion node;
5 when a descendant node of the insertion node is found to exist, resetting the aggregation
6 level according to a difference between the prefixes of forwarding information corresponding
7 to the insertion node and the descendant node, and when no descendant nodes of the insertion
8 node are found to exist, resetting the aggregation level according to the aggregation level of the
9 ancestor node of the insertion node;
10 inserting the forwarding information corresponding to the insertion node in the
11 forwarding table when the reset aggregation level is zero;
12 inserting the delegation node representative of the insertion node in the forwarding table
13 when the reset aggregation level is greater than zero; and
14 determining the source area of the inserted routing information, inserting the forwarding
15 information corresponding to the delegation node in the forwarding table when the source area
16 is a virtual area, and inserting the forwarding information corresponding to the insertion node
17 in the forwarding table when the source area is a local area.

1 6. The method of claim 2, comprised of performing said steps of resetting the
2 aggregation level to a reset aggregation level not greater than the maximum aggregation level
3 in an absence of the ancestor node, and inserting a delegation node representative of the

insertion node at the reset aggregation level, by:

setting a search level range whether the ancestor node of the insertion node exists within the search level range;

when the ancestor node of the insertion node exists within the search level range, determining whether a descendant node of the deletion node representative of the insertion node exists at the maximum aggregation level;

resetting the aggregation level according to a difference between the prefixes of the insertion and the descendant node of the delegation node when the descendant node of the delegation node exists at the maximum aggregation level; and

inserting the delegation node of the insertion node at the reset aggregation level.

7. A method of managing forwarding information comprising the steps of:

routing information is deleted from the routing table a deletion node corresponding to the deleted routing information in the aggregation tree;

forwarding information corresponding to the deletion node is in a forwarding table, searching for a descendant node of the deletion node at a predetermined maximum aggregation level; and

a descendant node exists for the deletion node at an aggregation level not greater than a predetermined maximum aggregation level, the descendant node as a new source node of a delegation node, and no descendant nodes exist for the deletion node at an aggregation level not greater than a predetermined maximum aggregation level, forwarding information corresponding

11 to the deletion node from the forwarding table.

1 8. The method of claim 7, comprising the step of, the deletion node is a source node
2 that created a delegation node, forwarding information corresponding to the delegation node
3 forwarding information corresponding to the deletion node.

1 9. A distributed architecture router, comprising: /
2 a switching module accommodating a plurality of routing protocols while
3 managing forwarding information within the distributed architecture router; and
4 a plurality of routing nodes each disposed to service networks within
5 corresponding source areas comprised of local areas, said plurality of routing nodes being
6 connected via said switching module to form a source area comprising a virtual area and share
7 in real time collected routing information assembled by a routing table and an aggregation tree
8 derived from said routing table.

1 10. The distributed architecture router of claim 9, comprised of said routing nodes
2 responding to insertion of new routing information into said routing table, by:
3 identifying in said aggregation tree a position for addition of an insertion node
4 corresponding to said new routing information;
5 making a search of said aggregation tree within a maximum aggregation level to
6 identify an ancestor node of said insertion node;

7 forgoing updating of said forwarding table with forwarding information
8 corresponding to said insertion node when said insertion node and said ancestor node
9 were generated the same said source area and said search identifies said ancestor node;

10 resetting said maximum aggregation level to a reset aggregation level not less
11 than said maximum aggregation level when said search fails to identify said ancestor
12 node and adding a delegation node representative of said insertion node at said reset
13 aggregation level;

14 making an identification of said source area of said new routing information;

15 inserting said forwarding information corresponding to said delegation node when
16 said identification establishes that said source area of said new routing information is a
17 virtual area; and

18 inserting said forwarding information corresponding to said delegation node
19 when said identification establishes that said source area of said new routing information
20 is a local area.